

REMARKS

Claims 1, 3-10, 12, 15-18, 20, 23-25, and 30 have been amended. Claims 26-29 and 31 have been cancelled. Claims 34-36 have been added. Claims 1-25, 30, and 32-36 remain in the application. Further examination and reconsideration of the application, as amended, is hereby requested.

Claims 1-4, 8, 10-11, 16, 18-19, 24, 26-28, 30, and 32-33 were rejected under 35 USC 102(e) as being anticipated by Katoh (2003/0090597).

Claims 5-6 and 31 were rejected under 35 USC 103(a) as being unpatentable over Katoh in view of Breihaupt (6,084,235).

Claim 7-9, 12-15, 17, 20-23, 25, and 29 were rejected under 35 USC 103(a) as being unpatentable over Katoh in view of Heimbuch (5,448,314).

Applicant has reviewed the Examiner's arguments in the office action and the prior art made of record and has amended the claims to further distinguish and clarify Applicant's invention over the art made of record.

For a reference to anticipate, the prior art reference must disclose each and every element of the claimed invention, as arranged in the claim. The Applicant wishes to note that Katoh does not disclose the Applicant's claimed invention, as amended. Katoh discloses in paragraph [0152] a single panel projection image display panel having different pixel regions of different colors that are displayed and then the image sub-frames are sequentially displaced such that the same area on the projection plane is sequentially irradiated with a different color region from the display panel. See also paragraphs [0156] and [0157] of Katoh which describes how each R, B, G, pixel is shifted and superimposed to create a full color image.

Applicant's invention, however, is quite different. Applicant is creating a sequential plurality of colors which fully illuminate all pixels of the image display panel rather than having a image display panel (e.g. spatial light modulator) having individual R, G, B pixels. For each sub-frame, Applicant displays the full sequence of primary colors before displacing the image by "less than 1 pixel" to display the next sub-frame with another full sequence of colors. Katoh discloses displaying a sub-frame with individual R, G, B pixels displayed at once, then

shifting the image *by 1 full pixel* to overlay a different color region on the projected pixel region then displaying the next sub-frame (see paragraph [0156]).

Applicant's claim 10, as amended, is representative. Applicant is claiming "a display system for creating a sequence of image frames." The display system includes "a spatial light modulator" as the image display panel which is "configured to modulate light to provide a plurality of sub-frame images for each of the image frames during a projected frame period." "A periodic light generator" is "configured to generate a plurality of colors of light for each of the plurality of sub-frame images having a color sequence with a varying color time period with respect to a characteristic sequential color time period, the periodic light generator disposed to pass the plurality of colors of light across the spatial light modulator." "A periodic wobbling device" is "configured to provide a relative displacement of the sub-frame images by less than one pixel for each varying color time period for each image frame." "A system timing unit" is "configured to synchronize the projected frame period to the periodic light generator and the periodic wobbling device to assure an integer relationship between the varying color time period and the projected frame period." Support for the amendments is found throughout the specification but specifically in paragraphs [0004], [[0025], [0036], [0038], [0039], [[0063], and [0064].

Katoh does not disclose having a periodic light generator in its claimed invention but rather teaches away from having a periodic light generator by having the display panel having separate color regions (see paragraph [0155]). Further, Katoh discloses shifting the projected image by one pixel (see paragraph [0156]) and not "less than one pixel" as Applicant is claiming. Nor does Katoh disclose synchronizing *"the projected frame period to the periodic light generator and periodic wobbling device to assume an integer relationship between the varying color time period and the projected frame period"* as Applicant is claiming.

The Examiner asserts that Breithaupt teaches that it is known to track the color sequential device. However, Breithaupt teaches that the color sequential device is tracked *to synchronize the color wheel to each new frame of data*, such as by comparing it to a reference signal (e.g. vertical sync). However, Applicant is claiming rather that the periodic light generator and wobbling device are *synchronized to have the frame period be an integer relationship to the varying time period* of the periodic light generator. That is, rather than having the color

wheel (aka periodic light generator) sync to the timing of the data frame period, the data frame period is itself tracked to the varying timing of the color wheel. Thus, the sub-frames are generated based on the timing of the color wheel which corresponds to the timing of the reference signal (but with tracking error) rather than the sub-frame being generated directly from the timing of the reference signal. This is done to ensure that the periodic light generator generates a complete set of primary colors at least once during a single image sub-frame (see page 5, [0025], last sentence). Thus, Applicant discovers the varying color time period and synchronizes the frame period T to be an integer relationship with the varying color time period. (see page 15, paragraph [0064]).

By having the frame period track the varying color time period, rather than having the varying color time period track a frame period that is derived from the vertical sync signal as in Breithaupt, the integer relationship can be maintained even if the reference signal, such as the vertical sync, is changed, such as by the channel changing on a TV or through the normal tracking errors of the color wheel to the reference signal. This ensures that each sub-frame image displayed always has a full set of colors because each sub-frame's data array comprises unique albeit slightly different pixel data (see page 9, paragraph [0044]).

Even if the color wheel tracks the vertical sync as in Breithaupt, there will always be some amount of variant deviation from the actual vertical sync due to tracking error. However, rather than having the data frames generated based on the vertical sync itself, due to the unique sub-frame data arrays in a wobulated system, it is more advantageous to have the frame period generated based on the timing of the varying color wheel period rather than directly on the vertical sync to ensure that there is a complete sequencing of colors for each sub-frame of data to ensure proper integration of the complete image by the eye to get the desired increased resolution. That is, a slightly varying data rate is less perceptible or noticeable than having incorrect color information (and thus incorrect data) displayed. Heimbuch et al., like Breithaupt et al. discloses modifying the speed of the color wheel to match the data frame rate (for instance, see abstract and col. 6:28-30).

All of the independent claims have been amended or added accordingly to as discussed above with respect to claim 10 to distinguish the Applicant's invention over the art made of record.

Applicant believes his claims as amended are patentable over the art of record, and that the amendments made herein are within the scope of a search properly conducted under the provisions of MPEP 904.02. Accordingly, claims 1-
5 25, 30, and 32-36 are deemed to be in condition for allowance, and such allowance is respectfully requested.

If for any reason the Examiner finds the Application other than in a condition for allowance, the Examiner is respectfully requested to call Applicants' undersigned representative at the number listed below to discuss the steps
10 necessary for placing the application in condition for allowance.

The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 08-2025. Should such fees be associated with an extension of time, Applicants respectfully request that this paper be considered a petition therefore.

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